

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter, or agreement with any objection or rejection of record.

Listing of Claims:

1. (Currently amended) A composition comprising an orthogonal glutamyl-tRNA (glutamyl O-tRNA)derived from one or more archaeal tRNAs, wherein the glutamyl O-tRNA comprises ~~at least about a 50% suppression efficiency in the presence of a cognate synthetase in response to a selector codon as compared to the glutamyl O-tRNA corresponding to a polynucleotide sequence as set forth in at least 80% identical to SEQ ID NO.: 67 (AE(GC) tRNA)~~ and suppresses in the presence of a glutamyl-tRNA synthetase derived from an RS selected from the group consisting of: an *Archaeoglobus fulgidus* synthetase, a *Methanosarcina mazei* synthetase, a *Methanobacterium thermoautotrophicum* synthetase, and a *Pyrococcus horikoshii* synthetase.

2. (Original) The composition of claim 1, wherein the glutamyl O-tRNA comprises a G:C base pair at position 10:28.

3. (Original) The composition of claim 1, wherein the selector codon is an amber codon.

4. (Currently amended) The composition of claim 1, wherein the glutamyl O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 67 (AE(GC) tRNA), orand a complementary polynucleotide sequence thereof.

5. (Currently amended) The composition of claim 1, ~~further comprising an orthogonal glutamyl aminoacyl tRNA synthetase (glutamyl O-RS)~~, wherein the glutamyl-

tRNA synthetase O-RS preferentially aminoacylates the glutamyl O-tRNA with a selected amino acid in response to the selector codon.

6. (Currently amended) The composition of claim 5, wherein the suppression efficiency of the glutamyl-tRNA synthetase O-RS and the glutamyl O-tRNA together is ~~to 104~~
~~5-fold~~ greater than the suppression efficiency of the glutamyl O-tRNA in the absence of the glutamyl-tRNA synthetase O-RS.

7. (Cancelled)

8. (Currently amended) The composition of claim 5, wherein the glutamyl-tRNA synthetase O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 69 (*AfRS*), SEQ ID NO.: 73 (*MmRS*), SEQ ID NO.: 75 (*MtRS*), or SEQ ID NO.: 77 (*PhRS*), or a conservative variation thereof.

9. (Cancelled)

10. (Cancelled)

11. (Cancelled)

12. (Original) The composition of claim 1, comprising a cell.

13. (Original) The composition of claim 12, wherein the cell is an *E. coli* cell.

14. (Original) The composition of claim 1, comprising a translation system.

15. (Currently amended) A cell comprising a translation system, wherein the translation system comprises:

an orthogonal glutamyl-tRNA (glutamyl O-tRNA), derived from one or more archaeal tRNAs, wherein the glutamyl O-tRNA comprises ~~at least about a 50% suppression efficiency in the presence of a cognate synthetase in response to a first selector codon as compared to the glutamyl O-tRNA comprising or encoded by a polynucleotide sequence at least 80% identical to as set forth in~~ SEQ ID NO.: 67 (*AE(GC) tRNA*);

a glutamyl-tRNA synthetase derived from an RS selected from the group consisting of: an *Archaeoglobus fulgidus* synthetase, a *Methanosarcina mazei* synthetase, a *Methanobacterium thermoautotrophicum* synthetase, and a *Pyrococcus horikoshii* synthetase

~~an orthogonal aminoacyl glutamyl tRNA synthetase (glutamyl-O-RS); and,~~
a first selected amino acid;
wherein the glutamyl O-tRNA recognizes ~~the~~ first selector codon, and the glutamyl-
~~tRNA synthetase-O-RS~~ preferentially aminoacylates the glutamyl O-tRNA with the first
selected amino acid.

16. (Original) The cell of claim 15, wherein the glutamyl O-tRNA comprises a G:C
base pair at position 10:28.

17. (Currently amended) The cell of claim 15, wherein the glutamyl O-tRNA
comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 67
(AE(GC)), ~~or and~~ a complementary polynucleotide sequence thereof, and wherein the
glutamyl-tRNA synthetase-O-RS comprises an amino acid sequence as set forth in any one
of SEQ ID NO.: 69 (AfRS), SEQ ID NO.: 73 (MmRS), SEQ ID NO.: 75 (MtRS), or SEQ ID
NO.: 77 (PhRS), ~~or a conservative variation thereof~~.

18. (Currently amended) The cell of claim 15, wherein the cell further comprises
an additional different O-tRNA/tRNA synthetaseO-RS pair and a second selected amino
acid, wherein the additional O-tRNA recognizes a second selector codon and the additional
tRNA synthetaseO-RS preferentially aminoacylates the additional O-tRNA with the second
selected amino acid.

19. (Cancelled)

20. (Original) The cell of claim 15, wherein the cell is a non-eukaryotic cell.

21. (Original) The cell of claim 20, wherein the non-eukaryotic cell is an *E. coli*
cell.

22. (Original) The cell of claim 15, further comprising a nucleic acid that comprises
a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises
a selector codon that is recognized by the glutamyl O-tRNA.

23. (Currently amended) An *E. coli* cell, comprising:
an orthogonal glutamyl tRNA (glutamyl O-tRNA), wherein the glutamyl O-tRNA
comprises ~~at least about a 50% suppression efficiency in the presence of a cognate synthetase~~

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~~in response to a selector codon as compared to the glutamyl O-tRNA comprising or encoded by a polynucleotide sequence as set forth in at least 80% identical to SEQ ID NO.: 67 (AE(GC) tRNA);~~

~~an orthogonal glutamyl aminoacyl tRNA synthetase (glutamyl O-RS), a glutamyl-tRNA synthetase, wherein the glutamyl-tRNA synthetase O-RS preferentially aminoacylates the glutamyl O-tRNA with a selected amino acid;~~

~~the selected amino acid; and,~~

~~a nucleic acid that comprises a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises the selector codon that is recognized by the glutamyl O-tRNA, and wherein the glutamyl O-tRNA is derived from one or more archaeal tRNAs and the glutamyl-tRNA synthetase O-RS is derived from an RSorganism selected from the group consisting of: an *Archaeoglobus fulgidus* (Af) synthetase, a *Methanosarcina mazei* (Mm) synthetase, a *Methanobacterium thermoautotrophicum* (Mt) synthetase, and a *Pyrococcus horikoshii* (Ph) synthetase.~~

Claims 24 to 49 (Cancelled).